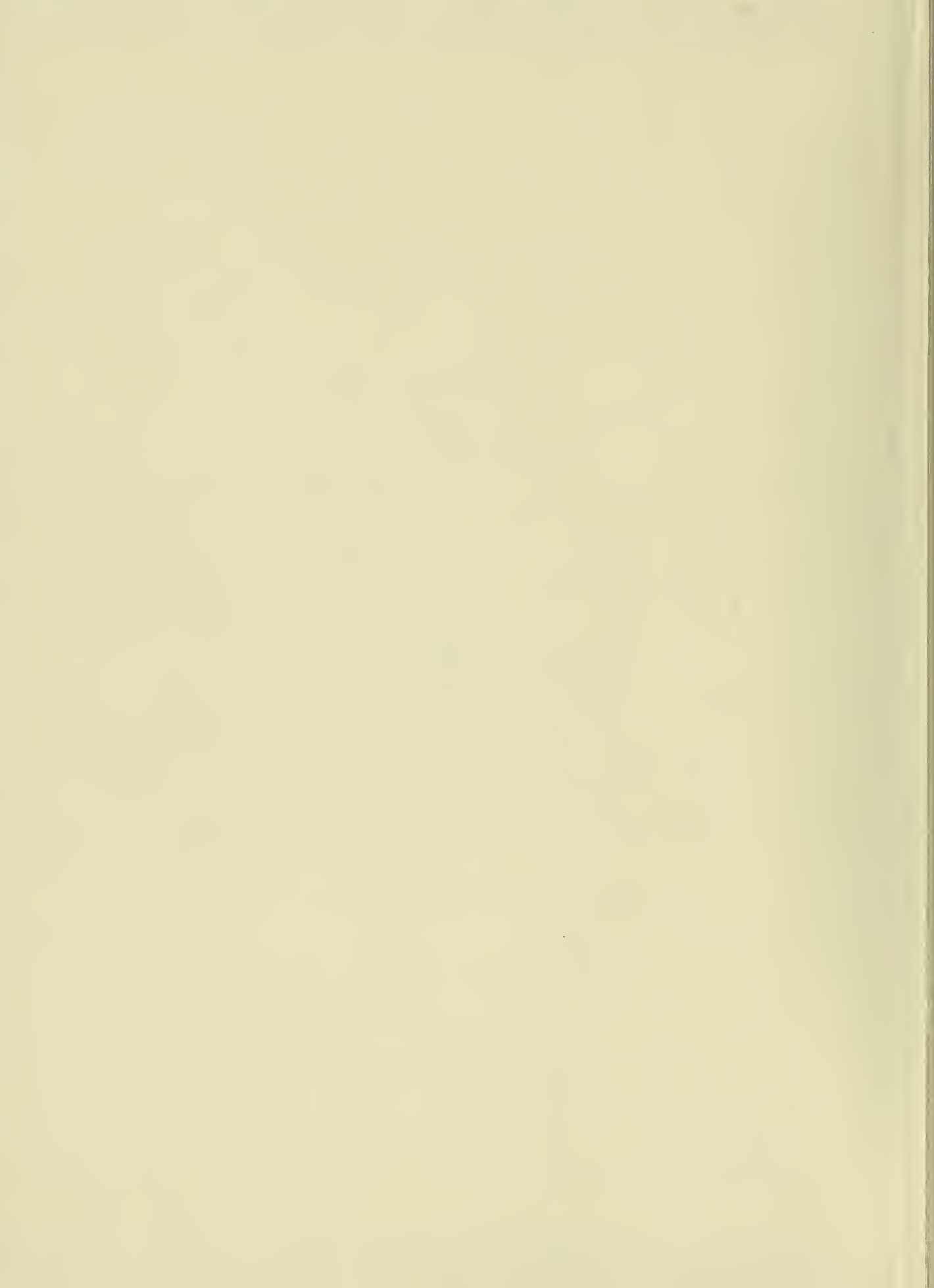


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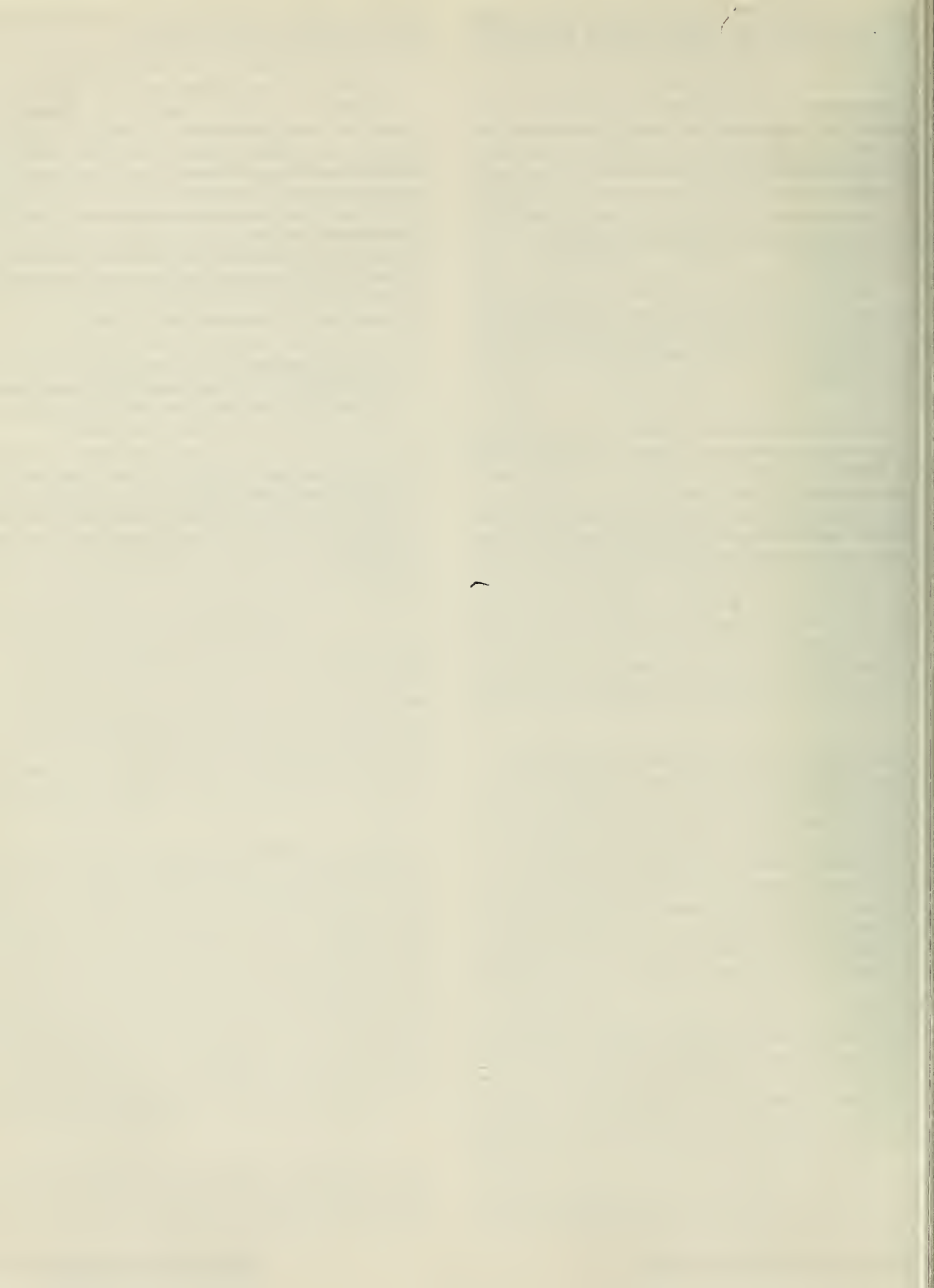
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PRELIMINARY REPORT
INDUSTRY SERIES

1987

Census of Manufactures

MC87-I-36E(P)
Issued August 1989

ELECTRONIC COMPONENTS

Industries 3671, 3672, 3674, 3675, 3676, 3677, 3678, and 3679

INTRODUCTION

This report presents preliminary statistics from the 1987 Census of Manufactures for those establishments classified in the industries listed above. These data will be superseded by a more comprehensive final paperbound report. The method of data collection and use of administrative data are discussed in detail in the appendix.

All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The definitions of these industries are the same as those used in the 1987 Standard Industrial Classification (SIC) Manual.¹

INDUSTRY 3671, ELECTRON TUBES

In the 1987 Census of Manufactures, Industry 3671, Electron Tubes, had employment of 29.1 thousand.

The total value of shipments for establishments classified in this industry was \$2.8 billion. The products primary to this industry appear in table 2 and aggregated to \$2.4 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to \$1.3 billion in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3672, PRINTED CIRCUIT BOARDS

In the 1987 Census of Manufactures, Industry 3672, Printed Circuit Boards, had employment of 58.9 thousand.

¹Standard Industrial Classification Manual: 1987. For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 041-001-00314-2.

The total value of shipments for establishments classified in this industry was \$4.2 billion. The products primary to this industry appear in table 2 and aggregated to \$4.3 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to \$1.8 billion in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3674, SEMICONDUCTORS AND RELATED DEVICES

In the 1987 Census of Manufactures, Industry 3674, Semiconductors and Related Devices, had employment of 183.3 thousand. The employment figure was 10 percent above the 166.5 thousand reported in 1982. Compared with 1986, employment in 1987 increased 6 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was \$19.6 billion. The products primary to this industry appear in table 2 and aggregated to \$17.8 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to \$6.4 billion in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3675, ELECTRONIC CAPACITORS

In the 1987 Census of Manufactures, Industry 3675, Electronic Capacitors, had employment of 23.6 thousand. The employment figure was 18 percent below the 28.9

Address inquiries to Bureau of the Census, Industry Division, Washington, DC 20233, or call Michael Narod (301) 763-7304.



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thousand reported in 1982. Compared with 1986, employment in 1987 increased 7 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was \$1.5 billion. The products primary to this industry appear in table 2 and aggregated to \$1.4 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to \$574.4 million in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3676, ELECTRONIC RESISTORS

In the 1987 Census of Manufactures, Industry 3676, Electronic Resistors, had employment of 15.5 thousand. The employment was 15 percent below the 18.3 thousand reported in 1982.

The total value of shipments for establishments classified in this industry was \$872.5 million. The products primary to this industry appear in table 2 and aggregated to \$862.3 million in 1987.

The cost of materials and services used by establishments in this industry amounted to \$273.1 million in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3677, ELECTRONIC COILS AND TRANSFORMERS

In the 1987 Census of Manufactures, Industry 3677, Electronic Coils and Transformers, had employment of 23.6 thousand. The employment figure was less than one percent below the 23.7 thousand reported in 1982.

The total value of shipments for establishments classified in this industry was \$1.2 billion. The products primary to this industry appear in table 2 and aggregated to \$1.2 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to \$484.3 million in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3678, ELECTRONIC CONNECTORS

In the 1987 Census of Manufactures, Industry 3678, Electronic Connectors, had employment of 42.5 thousand. The employment figure was 7 percent above the 39.7 thousand reported in 1982. Compared with 1986, employment in 1987 increased 10 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was \$3.9 billion. The products primary to this industry appear in table 2 and aggregated to \$3.7 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to \$1.5 billion in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3679, ELECTRONIC COMPONENTS, N.E.C.

In the 1987 Census of Manufactures, Industry 3679, Electronic Components, N.E.C., had employment of 173.6 thousand.

The total value of shipments for establishments classified in this industry was \$16.2 billion. The products primary to this industry appear in table 2 and aggregated to \$14.8 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to \$7.3 billion in 1987. Data on specific materials consumed appear in table 3.

ABBREVIATIONS AND SYMBOLS

The following abbreviations and symbols are used in the tables in this publication:

-	Represents zero.
(D)	Withheld to avoid disclosing data for individual companies; data are included in higher level totals.
(NA)	Not available.
(NC)	Not comparable.
(S)	Withheld because estimate did not meet publication standards on the basis of either the response rate or a consistency review.
(X)	Not applicable.
(Z)	Less than half the unit shown.
do	Ditto.
n.e.c.	Not elsewhere classified.
n.s.k.	Not specified by kind.
pt.	Part.
r	Revised.
SIC	Standard Industrial Classification.

Other abbreviations, such as lb, gal, yd, doz, bbl, and s tons, are used in the customary sense.

CONTACTS FOR DATA USERS

Subject Area	Contact	Phone
Census/ASM	Kenneth Hansen	(301) 763-7304
Durables	Michael Zampogna	(301) 763-2510
Nondurables		
Current Industrial Reports		
Durables	Malcolm Bernhardt	(301) 763-2518
Nondurables	Thomas Flood	(301) 763-5911
Import/Export Publications	Foreign Trade Division	(301) 763-5140
Industry Analysis and Forecasts	International Trade Administration	(202) 377-4356

Table 1. Historical Statistics for the Industry: 1987 and Earlier Years

[Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendix.]

Year¹	Companies² (no.)	All establishments³		All employees		Production workers			Value added by manufac- ture⁴ (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expend- itures (million dollars)	End-of- year inventories⁴ (million dollars)	Retros	
		Total (no.)	With 20 employ- ees or more (no.)	Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						Speci- alization (per- cent)	Cover- age (per- cent)
INDUSTRY 3671, ELECTRON TUBES⁵															
1987 Census ----	(NA)	114	63	29.1	814.6	21.1	42.1	519.3	1 431.9	1 347.2	2 766.7	105.0	485.9	(NA)	(NA)
INDUSTRY 3672, PRINTED CIRCUIT BOARDS⁵															
1987 Census ----	(NA)	895	464	58.9	1 233.0	43.3	89.3	758.6	2 418.4	1 820.3	4 207.0	224.8	504.1	(NA)	(NA)
INDUSTRY 3674, SEMICONDUCTORS AND RELATED DEVICES															
1987 Census ----	(NA)	846	443	183.3	5 457.1	87.3	175.5	1 851.9	13 084.1	6 434.1	19 577.6	1 929.8	2 926.6	(NA)	(NA)
1986 ASM ----	(NA)	(NA)	(NA)	172.9	4 967.1	79.2	155.4	1 687.2	10 910.9	4 784.5	15 785.0	2 220.2	2 576.5	(NA)	(NA)
1985 ASM ----	(NA)	(NA)	(NA)	190.4	5 016.3	91.8	177.5	1 837.2	10 872.1	5 427.6	16 487.3	2 831.7	2 807.8	(NA)	(NA)
1984 ASM ----	(NA)	(NA)	(NA)	192.3	5 216.0	96.1	186.6	1 838.1	13 414.3	6 039.5	19 134.5	2 817.6	3 044.2	(NA)	(NA)
1983 ASM ----	(NA)	(NA)	(NA)	169.3	4 287.1	84.1	161.7	1 464.9	9 991.3	4 640.7	14 339.4	1 831.6	2 626.0	(NA)	(NA)
1982 Census ----	685	766	352	166.5	3 785.0	81.3	154.4	1 313.3	8 356.6	4 196.0	12 429.9	1 723.8	2 260.7	94	96
1981 ASM ----	(NA)	(NA)	(NA)	169.5	3 405.0	84.9	161.1	1 312.2	7 729.8	4 018.3	11 701.5	1 493.1	2 029.1	(NA)	(NA)
1980 ASM ----	(NA)	(NA)	(NA)	160.7	2 935.8	87.3	170.8	1 177.9	7 055.2	3 816.1	10 500.8	1 595.8	1 978.2	(NA)	(NA)
1979 ASM ----	(NA)	(NA)	(NA)	142.9	2 249.5	81.1	160.0	935.5	5 591.5	2 958.7	8 266.7	850.5	1 471.6	(NA)	(NA)
1978 ASM ----	(NA)	(NA)	(NA)	130.8	1 898.9	73.6	145.4	809.6	4 203.1	2 310.1	6 435.4	636.9	1 069.9	(NA)	(NA)
1977 Census ----	502	545	219	114.0	1 601.1	63.5	126.5	670.3	3 409.6	2 011.2	5 322.6	409.0	909.5	93	94
1976 ASM ----	(NA)	(NA)	(NA)	102.5	1 371.2	57.9	118.8	529.6	2 858.8	1 623.7	4 473.8	362.3	812.1	(NA)	(NA)
1975 ASM ----	(NA)	(NA)	(NA)	96.7	1 200.5	52.4	103.9	451.1	2 182.4	1 093.9	3 276.9	282.9	777.4	(NA)	(NA)
1974 ASM ----	(NA)	(NA)	(NA)	133.1	1 466.6	81.6	159.1	626.0	2 738.2	1 756.5	4 305.1	479.2	917.0	(NA)	(NA)
1973 ASM ----	(NA)	(NA)	(NA)	120.0	1 201.0	74.7	148.2	552.7	2 372.9	1 360.9	3 647.7	334.6	660.2	(NA)	(NA)
1972 Census ----	288	325	196	97.6	953.1	58.4	116.3	419.8	1 735.1	931.4	2 704.8	170.5	502.8	89	92
INDUSTRY 3675, ELECTRONIC CAPACITORS															
1987 Census ----	(NA)	141	101	23.6	411.0	17.3	33.3	268.4	896.0	574.4	1 470.6	79.2	366.4	(NA)	(NA)
1986 ASM ----	(NA)	(NA)	(NA)	22.1	380.0	17.0	33.1	243.5	747.2	483.5	1 241.4	75.1	308.7	(NA)	(NA)
1985 ASM ----	(NA)	(NA)	(NA)	26.5	417.9	20.2	38.3	282.5	851.6	536.1	1 410.0	125.2	349.7	(NA)	(NA)
1984 ASM ----	(NA)	(NA)	(NA)	32.2	501.8	25.1	50.4	339.0	1 059.0	696.5	1 702.0	111.9	416.0	(NA)	(NA)
1983 ASM ----	(NA)	(NA)	(NA)	27.9	403.1	21.0	40.5	268.5	813.8	539.0	1 330.6	68.4	333.3	(NA)	(NA)
1982 Census ----	93	130	99	28.9	387.9	21.6	40.7	243.6	728.4	466.9	1 188.9	72.3	289.2	94	90
1981 ASM ----	(NA)	(NA)	(NA)	28.4	363.3	22.2	43.6	239.9	680.1	475.8	1 151.6	76.5	260.9	(NA)	(NA)
1980 ASM ----	(NA)	(NA)	(NA)	30.6	343.0	24.5	46.4	244.4	728.1	479.7	1 180.2	69.2	260.0	(NA)	(NA)
1979 ASM ----	(NA)	(NA)	(NA)	31.8	322.3	26.6	52.8	236.2	631.6	393.5	1 005.1	45.6	219.4	(NA)	(NA)
1978 ASM ----	(NA)	(NA)	(NA)	30.9	290.7	25.5	49.7	201.4	523.9	318.6	830.1	43.0	177.6	(NA)	(NA)
1977 Census ----	86	118	97	28.9	260.5	23.4	45.7	179.0	486.1	266.2	742.3	34.0	152.4	92	91
1976 ASM ----	(NA)	(NA)	(NA)	27.2	227.2	21.5	40.5	150.1	404.3	233.5	629.1	22.5	138.7	(NA)	(NA)
1975 ASM ----	(NA)	(NA)	(NA)	23.4	183.9	17.9	34.1	120.6	320.7	174.4	506.9	15.7	126.0	(NA)	(NA)
1974 ASM ----	(NA)	(NA)	(NA)	33.6	232.5	27.6	52.4	161.7	443.4	246.2	672.7	31.2	151.0	(NA)	(NA)
1973 ASM ----	(NA)	(NA)	(NA)	34.3	218.3	28.5	56.0	158.0	406.6	206.9	605.0	25.8	123.6	(NA)	(NA)
1972 Census ----	79	113	101	27.6	169.2	22.5	44.5	119.6	298.6	152.9	445.8	13.4	99.6	90	87
INDUSTRY 3676, ELECTRONIC RESISTORS															
1987 Census ----	(NA)	114	85	15.5	288.0	10.7	21.2	149.6	598.7	273.1	872.5	44.1	183.8	(NA)	(NA)
1986 ASM ----	(NA)	(NA)	(NA)	17.2	297.2	11.7	22.7	155.8	640.7	276.2	918.9	⁶⁹⁹.3	201.9	(NA)	(NA)
1985 ASM ----	(NA)	(NA)	(NA)	17.3	297.2	11.8	22.8	159.9	643.8	280.9	908.5	⁶⁸⁸.0	193.3	(NA)	(NA)
1984 ASM ----	(NA)	(NA)	(NA)	18.5	294.3	13.0	26.9	159.4	724.1	269.6	983.0	(D)	181.4	(NA)	(NA)
1983 ASM ----	(NA)	(NA)	(NA)	15.8	246.7	11.0	20.7	125.4	543.0	214.3	761.6	38.6	163.2	(NA)	(NA)
1982 Census ----	77	103	85	18.3	258.4	12.4	23.8	139.1	524.0	238.4	765.8	28.9	164.8	89	88
1981 ASM⁷ ----	(NA)	(NA)	(NA)	21.7	295.4	15.0	28.4	168.9	534.1	259.0	784.6	36.1	161.9	(NA)	(NA)
1980 ASM⁷ ----	(NA)	(NA)	(NA)	23.3	299.3	16.2	29.9	167.3	550.6	261.1	794.4	49.6	153.6	(NA)	(NA)
1979 ASM ----	(NA)	(NA)	(NA)	22.8	253.6	17.0	33.2	151.7	484.9	197.8	664.2	36.7	138.9	(NA)	(NA)
1978 ASM ----	(NA)	(NA)	(NA)	21.5	223.4	16.0	31.2	137.7	411.9	184.9	591.1	22.1	111.8	(NA)	(NA)
1977 Census ----	76	101	80	21.3	210.9	15.9	32.4	130.6	401.0	186.2	578.3	25.1	104.2	87	81
1976 ASM ----	(NA)	(NA)	(NA)	17.4	168.4	12.5	25.7	103.1	316.5	149.1	461.5	18.7	90.9	(NA)	(NA)
1975 ASM ----	(NA)	(NA)	(NA)	16.6	148.2	11.7	23.0	86.5	266.7	113.7	387.3	9.8	85.6	(NA)	(NA)
1974 ASM ----	(NA)	(NA)	(NA)	23.4	187.9	17.3	33.8	116.7	335.8	142.3	471.2	21.7	95.1	(NA)	(NA)
1973 ASM ----	(NA)	(NA)	(NA)	24.3	187.6	18.9	37.8	123.7	339.6	150.0	477.8	18.1	83.8	(NA)	(NA)
1972 Census ----	67	86	78	20.5	144.5	15.7	31.3	93.9	263.5	111.6	372.2	10.4	62.7	90	74
INDUSTRY 3677, ELECTRONIC COILS AND TRANSFORMERS															
1987 Census ----	(NA)	409	242	23.6	390.5	18.0	34.2	234.1	745.2	484.3	1 233.3	28.8	194.6	(NA)	(NA)
1986 ASM ----	(NA)	(NA)	(NA)	20.9	300.4	16.7	31.5	189.6	567.6	373.5	952.4	⁶¹⁵.8	142.1	(NA)	(NA)
1985 ASM ----	(NA)	(NA)	(NA)	24.0	334.5	19.5	35.9	215.4	682.6	437.3	1 130.2	19.7	166.2	(NA)	(NA)
1984 ASM ----	(NA)	(NA)	(NA)	25.5	339.2	21.1	41.9	232.7	653.2	446.0	1 085.2	(D)	170.0	(NA)	(NA)
1983 ASM ----	(NA)	(NA)	(NA)	26.2	346.3	21.2	39.6	219.4	625.9	415.2	1 029.4	31.8	160.6	(NA)	(NA)
1982 Census ----	353	386	245	23.7	293.4	18.7	35.2	183.5	537.6	327.6	863.3	36.5	127.5	91	84
1981 ASM ----	(NA)	(NA)	(NA)	22.5	261.1	18.3	36.4	171.2	481.5	315.9	794.0	25.2	109.6	(NA)	(NA)
1980 ASM ----	(NA)	(NA)	(NA)	22.5	230.8	18.6	35.3	155.8	424.5	276.6	699.5	21.1	96.7	(NA)	(NA)
1979 ASM ----	(NA)	(NA)	(NA)	24.3	219.1	19.9	36.9	147.2	397.0	267.8	655.9	16.5	98.6	(NA)	(NA)
1978 ASM ----	(NA)	(NA)	(NA)	21.3	180.9	17.8	33.1	122.4	323.1	223.7	542.5	15.4	106.2	(NA)	(NA)
1977 Census ----	277	294	194	20.7	166.6	17.1	31.8	113.1	289.1	221.0	506.4	9.5	74.5	91	75
1976 ASM ----	(NA)	(NA)	(NA)	17.9	150.9	14.7	27.3	100.0	249.1	204.2	446.4	7.8	95.0	(NA)	(NA)
1975 ASM ----	(NA)	(NA)	(NA)	17.0	142.0	13.3	25.3	88.1	229.6	173.0	406.7	13.7	76.0	(NA)	(NA)
1974 ASM ----	(NA)	(NA)	(NA)	21.9	153.5	18.2	34.2	104.1	268.0	198.0	462.0	10.2	84.9	(NA)	(NA)
1973 ASM ----	(NA)	(NA)	(NA)	23.9	141.8	19.8	36.8	103.5	225.0	176.0	403.4	8.7	68.5	(NA)	(NA)
1972 Census ----	215	246	204	23.9	142.0	19.2	37.0	97.6	213.9	146.1	354.1	8.8	59.3	87	79
INDUSTRY 3678, ELECTRONIC CONNECTORS															
1987 Census ----	(NA)	282	200	42.5	968.6	29.9	60.9	578.5	2 449.8	1 476.3	3 909.7	140.7	771.4	(NA)	(NA)
1986 ASM ----	(NA)	(NA)	(NA)	38.6	872.1	27.6	53.6	517.7	2 137.0	1 094.0	3 211.8	125.4	668.5	(NA)	(NA)
1985 ASM ----	(NA)	(NA)	(NA)	39.2	818.3	28.2	52.8	504.2	1 968.6	1 086.4	3 097.8	207.3	645.5	(NA)	(NA)
1984 ASM ----	(NA)	(NA)	(NA)	39.2	828.4	29.2	58.1	502.8	2 232.3	1 299.5	3 491.6	184.8	872.1	(NA)	(NA)
1983 ASM ----	(NA)	(NA)	(NA)	36.7	697.9										

See footnotes at end of table.

Table 1. Historical Statistics for the Industry: 1987 and Earlier Years—Con.

[Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendix]

Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendix.															
Year ¹	Com- panies ² (no.)	All establishments ³		All employees		Production workers			Value added by manufac- ture ⁴ (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expendi- tures (million dollars)	End-of- year invento- ries ⁴ (million dollars)	Ratios	
		Total (no.)	With 20 employ- ees or more (no.)	Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						Spe- cial- ization (per- cent)	Cover- age (per- cent)
INDUSTRY 3678, ELECTRONIC CONNECTORS—Con.															
1982 Census ----	148	198	159	39.7	687.5	28.0	54.2	418.4	1 633.5	974.9	2 565.0	168.7	603.8	87	91
1981 ASM -----	(NA)	(NA)	(NA)	35.3	570.3	24.9	49.7	357.5	1 519.6	827.0	2 310.9	117.8	489.0	(NA)	(NA)
1980 ASM -----	(NA)	(NA)	(NA)	37.0	542.8	27.3	53.8	340.8	1 470.7	827.0	2 269.0	140.9	487.3	(NA)	(NA)
1979 ASM -----	(NA)	(NA)	(NA)	34.4	465.5	25.4	50.1	287.7	1 306.1	643.7	1 872.8	71.0	417.3	(NA)	(NA)
1978 ASM -----	(NA)	(NA)	(NA)	30.2	385.6	22.3	43.4	238.2	996.6	472.6	1 417.1	51.6	311.0	(NA)	(NA)
1977 Census ----	109	133	107	26.0	303.6	19.1	37.6	185.1	754.2	371.7	1 104.6	40.4	234.5	78	86
1976 ASM -----	(NA)	(NA)	(NA)	22.1	242.3	15.8	30.9	143.3	573.4	277.8	846.0	26.1	199.1	(NA)	(NA)
1975 ASM -----	(NA)	(NA)	(NA)	22.9	232.7	16.2	31.4	136.6	502.9	245.6	772.6	27.3	187.2	(NA)	(NA)
1974 ASM -----	(NA)	(NA)	(NA)	24.7	224.2	18.0	35.9	137.4	548.9	259.1	776.2	26.6	191.2	(NA)	(NA)
1973 ASM -----	(NA)	(NA)	(NA)	23.4	194.4	17.5	35.4	124.0	450.0	226.0	653.8	17.9	139.7	(NA)	(NA)
1972 Census ----	75	92	80	18.1	141.2	13.5	26.8	90.2	345.6	141.0	483.3	12.2	95.5	87	81
INDUSTRY 3679, ELECTRONIC COMPONENTS, N.E.C. ⁵															
1987 Census ----	(NA)	2 894	1 312	173.6	4 101.5	104.1	201.6	1 785.8	8 964.1	7 348.1	16 190.8	559.0	2 909.3	(NA)	(NA)

Note: Establishments of single unit companies with up to 20 employees (cutoff varied by industry) were excluded from the mail portion of the census. Data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were estimated based on administrative-record information from other agencies in conjunction with industry averages. These establishments accounted for the following percent of total value of shipments: SIC 3671, 5%; SIC 3672, 13%; SIC 3674, 13%; SIC 3675, 11%; SIC 3676, 10%; SIC 3677, 16%; SIC 3678, 10%; and SIC 3679, 17%.

¹In annual survey of manufactures (ASM) years, data are estimates based on a representative sample of establishments canvassed annually and may differ from results of a complete canvass of all establishments. ASM publication shows percentage standard errors. Unless otherwise noted, for data prior to 1972, see 1972 Census of Manufactures, vol. II, table 1a of the industry chapter.

²For the census, a company is defined as a business organization consisting of one establishment or more under common ownership or control.

³Includes establishments with payroll at any time during year.

⁴Beginning with the 1982 Census of Manufactures, all respondents were requested to report their inventories at (the lower of) cost or market prior to adjustment to LIFO cost. This is a change from prior Censuses and annual surveys of manufactures in which respondents were permitted to value their inventories using any generally accepted accounting method. Consequently, inventories and value added by manufacture are not comparable to prior-year data.

⁵Industry definition is new for 1987 Census of Manufactures. An explanation of the Standard Industrial Classification revision will appear in the final industry series text that supercedes this report.

⁶Estimates for new capital expenditures have associated standard error of 15 percent or more and may be of limited reliability. Estimates for other data items are of acceptable reliability.

⁷Data either have associated standard errors exceeding 15 percent or are not consistent with other census series and related data; thus, these estimates may be of limited reliability.

Table 2. Product and Product Classes—Value of Shipments by All Producers: 1987 and 1982

[Includes value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text.]

1987 product code	Product	1987		1982	
		Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)	Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)
3671--	ELECTRON TUBES, ALL TYPES				
	Total -----	(NA)	2 380.2	(NA)	(²)
36713 -- 36713 00	Transmittal, industrial, and special purpose electron tubes, except x-ray: Transmittal, industrial, and special purpose electron tubes, except x-ray (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components) -----	(NA)	1 198.9	38	962.1
36714 -- 36714 00	Receiving type electron tubes, including cathode ray picture tubes (new and rebuilt): Receiving type electron tubes, including cathode ray picture tubes (new and rebuilt) (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components) -----	(NA)	1 000.1	20	873.0
36715 -- 36715 00	Electron tube parts: Electron tube parts (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components) -----	(NA)	154.9	(NA)	(³)
36710 -- 36710 00	Electron tubes, n.s.k. ----- Electron tubes, n.s.k., typically for establishments with 20 employees or more (see note) -----	(NA)	26.3	(NA)	19.1
36710 02	Electron tubes, n.s.k., typically for establishments with less than 20 employees (see note) -----	(NA)	12.5	(NA)	10.3
		(NA)	13.8	(NA)	8.8
3672--	PRINTED CIRCUIT BOARDS				
	Total -----	(NA)	4 321.7	(NA)	(⁴)
36720 -- 36720 00	Printed circuit boards: Printed circuit boards (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components) -----	(NA)	4 168.2	485	2 288.9
36720 02	Printed circuit boards, n.s.k., typically for establishments with less than 20 employees (see note) -----	(NA)	153.5	(NA)	(⁴)

See footnotes at end of table.

Table 2. Product and Product Classes—Value of Shipments by All Producers: 1987 and 1982

—Con.

[Includes value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text.]

1987 product code	Product	1987		1982	
		Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)	Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)
3674--	SEMICONDUCTORS AND RELATED DEVICES				
	Total	(NA)	17 778.6	(NA)	11 215.4
36741 --	Integrated microcircuits (including semiconductor networks, microprocessors, and MOS memories):				
36741 00	Integrated microcircuits (including semiconductor networks, microprocessors, and MOS memories) (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components)	(NA)	12 890.2	124	7 298.4
36742 --	Transistors:				
36742 00	Transistors (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components)	(NA)	732.8	40	596.1
36743 --	Diodes and rectifiers:				
36743 00	Diodes and rectifiers (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components)	(NA)	663.5	53	506.2
36749 --	Other semiconductor devices (including semiconductor parts, such as wafers and heat sinks):				
36749 00	Other semiconductor devices (including semiconductor parts, such as wafers and heat sinks) (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components)	(NA)	2 577.9	119	2 334.8
36740 --	Semiconductors and related devices, n.s.k.	(NA)	914.1	(NA)	479.9
36740 00	Semiconductors and related devices, n.s.k., typically for establishments with 20 employees or more (see note)	(NA)	705.7	(NA)	364.4
36740 02	Semiconductors and related devices, n.s.k., typically for establishments with less than 20 employees (see note)	(NA)	208.4	(NA)	115.5
3675--	ELECTRONIC CAPACITORS				
	Total	(NA)	1 387.2	(NA)	1 207.1
36750 --	Capacitors for electronic circuitry:				
36750 00	Capacitors for electronic circuitry (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components)	(NA)	1 373.3	92	1 200.4
36750 02	Capacitors for electronic circuitry, n.s.k., typically for establishments with less than 20 employees (see note)	(NA)	13.9	(NA)	6.7
3676--	ELECTRONIC RESISTORS				
	Total	(NA)	862.3	(NA)	758.3
36760 --	Resistors for electronic circuitry:				
36760 00	Resistors for electronic circuitry (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components)	(NA)	853.8	94	756.1
36760 02	Resistors for electronic circuitry, n.s.k., typically for establishments with less than 20 employees (see note)	(NA)	8.5	(NA)	2.2
3677--	ELECTRONIC COILS AND TRANSFORMERS				
	Total	(NA)	1 200.8	(NA)	924.6
36770 --	Coils, transformers, reactors, and chokes for electronic circuitry:				
36770 00	Coils, transformers, reactors, and chokes for electronic circuitry (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components)	(NA)	1 149.4	301	898.1
36770 02	Coils, transformers, reactors, and chokes for electronic circuitry, n.s.k., typically for establishments with less than 20 employees (see note)	(NA)	51.4	(NA)	26.5
3678--	CONNECTORS FOR ELECTRONIC CIRCUITRY				
	Total	(NA)	3 668.1	(NA)	2 353.3
36781 --	Coaxial (RF) connectors for electronic circuitry:				
36781 00	Coaxial (RF) connectors for electronic circuitry (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components)	(NA)	374.2	33	223.3
36782 --	Cylindrical connectors for electronic circuitry:				
36782 00	Cylindrical connectors for electronic circuitry (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components)	(NA)	571.5	31	411.7
36783 --	Rack and panel (rectangular) connectors for electronic circuitry:				
36783 00	Rack and panel (rectangular) connectors for electronic circuitry (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components)	(NA)	493.2	28	401.2
36784 --	Printed circuit connectors for electronic circuitry:				
36784 00	Printed circuit connectors for electronic circuitry (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components)	(NA)	1 049.0	47	464.0
36785 --	Other connectors for electronic circuitry, including parts:				
36785 00	Other connectors for electronic circuitry, including parts (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components)	(NA)	1 023.4	77	740.0

See footnotes at end of table.

Table 2. Product and Product Classes—Value of Shipments by All Producers: 1987 and 1982
—Con.

[Includes value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text.]

1987 product code	Product	1987		1982	
		Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)	Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)
3678- --	CONNECTORS FOR ELECTRONIC CIRCUITRY—Con.				
36780 --	Connectors for electronic circuitry, n.s.k. -----	(NA)	156.8	(NA)	113.1
36780 00	Connectors for electronic circuitry, n.s.k., typically for establishments with 20 employees or more (see note) -----	(NA)	95.3	(NA)	101.2
36780 02	Connectors for electronic circuitry, n.s.k., typically for establishments with less than 20 employees (see note) -----	(NA)	61.5	(NA)	11.9
3679- --	ELECTRONIC COMPONENTS, N.E.C.				
	Total -----	(NA)	14 769.6	(NA)	(⁵)
36791 --	Crystals, filters, piezoelectric, and other related devices:				
36791 00	Crystals, filters, piezoelectric, and other related devices (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components) -----	(NA)	617.8	98	429.8
36793 --	Microwave components and devices, except antennae, tubes, and semiconductors:				
36793 00	Microwave components and devices, except antennae, tubes, and semiconductors (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components) -----	(NA)	1 200.6	100	794.5
36795 --	Transducers, electrical/electronic input or output, n.e.c.:				
36795 00	Transducers, electrical/electronic input or output, n.e.c. (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components) -----	(NA)	637.9	77	357.0
36796 --	Switches, mechanical, for electronic circuitry:				
36796 00	Switches, mechanical, for electronic circuitry (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components) -----	(NA)	661.5	60	468.8
36798 --	Complex components:				
36798 00	Complex components (two components or more packaged and shipped as a single unit) (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components) -----	(NA)	4 956.1	118	2 655.9
36799 --	Other electronic components, n.e.c. -----	(NA)	4 048.1	504	4 033.6
36799 30	Earphones and headsets (except telephone), phonograph cartridges and pickups, phonograph needles, and styli (for additional detail, see Current Industrial Report MA-36M, Radio and Television Receivers, Phonographs, and Related Equipment) -----	(NA)	42.3	504	⁶ 4 033.6
36799 20	Other electronic components, n.e.c. (including magnetic recording and reproducing heads; static power supply converters for electronic applications, sold separately; electronic cable harness assemblies; liquid crystal displays and magnetic cores, excluding electron tube parts (for additional detail, see Current Industrial Report MA-36Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components) -----	(NA)	3 683.8		
36799 00	Other electronic components, n.e.c., n.s.k. -----	(NA)	321.9		
36790 --	Electronic components, n.e.c., n.s.k. -----	(NA)	2 647.6	(NA)	(⁵)
36790 00	Electronic components, n.e.c., n.s.k., typically for establishments with 20 employees or more (see note) -----	(NA)	2 244.7	(NA)	(⁵)
36790 02	Electronic components, n.e.c., n.s.k., typically for establishments with less than 20 employees (see note) -----	(NA)	402.9	(NA)	(⁵)

Note: In 1982 Census of Manufactures, data for establishments of small single-unit companies with up to 20 employees were estimated from administrative-record data rather than data actually collected from respondents. Employment cutoff used for administrative records for each industry and shipments figures are included in code ending with "002". In both 1982 and 1977 Censuses of Manufactures, products not completely identified on standard forms were coded in appropriate product class (five-digit) followed by "00" or to appropriate product group code (four-digit) followed by "000".

¹Data reported by all producers, not just those with shipments of \$100,000 or more.

²For some establishments, data have been estimated from central unit values which are based on quantity-value relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

³Due to changes made in the 1987 Standard Industrial Classification, data for 1982 are not available. Electron tube parts were reclassified from product code 36799 00 to new product code 36715 00.

⁴Due to changes made in the 1987 Standard Industrial Classification, data for 1982 are not available. Printed circuit boards were reclassified from old product code 36797 00 to new product code 36720 00.

⁵Due to changes made in the 1987 Standard Industrial Classification, data for 1982 are not available. Electron tube parts, magnetic and optical recording media, electronic relays, and printed circuit boards were reclassified in 1987. For a more detail explanation of the Standard Industrial Classification revision, see the final industry series text that supercedes this report.

⁶In 1982, other electronic components included electron tube parts, which were moved to new product code 36715 00 in 1987.

Table 3. Materials Consumed by Kind: 1987 and 1982

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
INDUSTRY 3671, ELECTRON TUBES					
	Materials, parts, containers, and supplies -----	(X)	³¹ 093.6	(X)	(³)
	Mill shapes and forms, except castings:				
331001	Carbon steel ----- 1,000 s tons..	(D)	(D)	(NA)	(NA)
331020	Alloy steel, except stainless ----- do..	(S)	1.1	(NA)	(NA)
331031	Stainless steel ----- do..	(S)	5.4	(NA)	(NA)
	Copper and copper-base alloy:				
335728	Bare wire for electrical conduction only ----- mil lb..	.3	.7	(NA)	(NA)
335102	Rod, bar, and mechanical wire, including extruded and/ or drawn shapes ----- do..	*1.4	2.5	(NA)	(NA)
335143	Plate, sheet, and strip, including military cups and discs ----- do..	*.6	1.6	(NA)	(NA)
335152	Pipe and tube ----- do..	*.3	.9	(NA)	(NA)
	Aluminum and aluminum-base alloy:				
335301	Sheet, plate, and foil ----- mil lb..	(S)	.6	(NA)	(NA)
335405	Extruded shapes, including extruded rod, bar, pipe, tube, etc. ----- do..	(D)	(D)	(NA)	(NA)
335008	All other aluminum mill shapes and forms ----- do..	(D)	(D)	(NA)	(NA)
335616	Nickel and nickel-base alloy mill shapes and forms ----- do..	(S)	2.0	(NA)	(NA)
335691	Tantalum mill products ----- 1,000 lb..	(D)	(D)	(NA)	(NA)
335791	Insulated copper wire and cable (except magnet wire) ----- mil lb..	(S)	3.0	(NA)	(NA)
335770	Magnet wire ----- do..	(D)	(D)	(NA)	(NA)
	Castings (rough and semifinished):				
332012	Iron (gray and malleable) and steel ----- 1,000 s tons..	(D)	(D)	(NA)	(NA)
336005	Aluminum and aluminum-base alloy ----- mil lb..	(D)	(D)	(NA)	(NA)
336003	Other nonferrous ----- do..	(S)	1.3	(NA)	(NA)
339915	Metal powders ----- do..	(S)	6.5	(NA)	(NA)
333902	Precious metals, all forms (including ingot, sheet, strip, solder, plating, electrodes, etc.), except gold ----- 1,000 troy ounces..	(S)	4.6	(NA)	(NA)
333905	Gold, all forms (including ingot, sheet, strip, solder, plating, electrodes, etc.) ----- do..	12.1	4.5	(NA)	(NA)
362111	Fractional horsepower electric motors less than 1 hp ----- number..	4.3	1.0	(NA)	(NA)
367004	Resistors, capacitors, transformers, electron tubes, semiconductors, and other electronic-type components -----	(X)	56.6	(NA)	(NA)
281995	Silicon, hyperpure ----- 1,000 kilograms..	(S)	.4	(NA)	(NA)
333977	Germanium ----- 1,000 lb..	(D)	(D)	(NA)	(NA)
265001	Paperboard containers, boxes, and corrugated paperboard -----	(X)	5.0	(NA)	(NA)
333998	Silicon, unalloyed ----- 1,000 s tons..	(D)	(D)	(NA)	(NA)
339913	Ferrites (powder and paste) -----	(X)	(D)	(NA)	(NA)
	Glass and glass products:				
322923	Tube blanks, except color television picture -----	(X)	8.5	(NA)	(NA)
322924	Color television picture tube blanks -----	(X)	353.5	(NA)	(NA)
320311	Other than tube blanks -----	(X)	8.4	(NA)	(NA)
	Bearings, including mounted and unmounted:				
356218	Ball -----	(X)	.3	(NA)	(NA)
356201	Roller -----	(X)	(D)	(NA)	(NA)
364300	Current-carrying wiring devices -----	(X)	4.9	(NA)	(NA)
382501	Electrical instrument mechanisms and meter movements, including instrument relays -----	(X)	9.3	(NA)	(NA)
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding sheets, rods, tubes, and shapes ----- mil lb..	(S)	1.2	(NA)	(NA)
344401	Sheet metal products, except stampings -----	(X)	23.8	(NA)	(NA)
345001	Bolts, nuts, screws, washers, rivets, and screw machine products -----	(X)	6.8	(NA)	(NA)
346901	Metal stampings -----	(X)	57.8	(NA)	(NA)
308006	Fabricated plastics products (except gaskets, hose, and belting) -----	(X)	12.7	(NA)	(NA)
365150	Loud speakers, microphones, and tuners (all types) -----	(X)	.1	(NA)	(NA)
366301	Electronic communication equipment -----	(X)	.3	(NA)	(NA)
357004	Electronic computing equipment and parts -----	(X)	(D)	(NA)	(NA)
382700	Optical instruments and lenses, except sighting, tracking, and fire control -----	(X)	2.9	(NA)	(NA)
333951	Doped chemicals for electronic use -----	(X)	1.3	(NA)	(NA)
970099	All other materials and components, parts, containers, and supplies -----	(X)	266.9	(NA)	(NA)
971000	Materials, parts, containers, and supplies, n.s.k. ² -----	(X)	197.7	(NA)	(NA)
INDUSTRY 3672, PRINTED CIRCUIT BOARDS					
	Materials, parts, containers, and supplies -----	(X)	³¹ 631.4	(NA)	(³)
	Mill shapes and forms, except castings:				
331001	Carbon steel ----- 1,000 s tons..	(D)	(D)	(NA)	(NA)
331020	Alloy steel, except stainless ----- do..	(S)	(Z)	(NA)	(NA)
331031	Stainless steel ----- do..	(S)	.3	(NA)	(NA)
	Copper and copper-base alloy:				
335728	Bare wire for electrical conduction only ----- mil lb..	(S)	.4	(NA)	(NA)
335102	Rod, bar, and mechanical wire, including extruded and/ or drawn shapes ----- do..	(S)	3.3	(NA)	(NA)
335143	Plate, sheet, and strip, including military cups and discs ----- do..	(S)	69.1	(NA)	(NA)
335152	Pipe and tube ----- do..	-	-	(NA)	(NA)
	Aluminum and aluminum-base alloy:				
335301	Sheet, plate, and foil ----- mil lb..	(S)	6.0	(NA)	(NA)
335405	Extruded shapes, including extruded rod, bar, pipe, tube, etc. ----- do..	(D)	(D)	(NA)	(NA)
335008	All other aluminum mill shapes and forms ----- do..	(D)	(D)	(NA)	(NA)
335616	Nickel and nickel-base alloy mill shapes and forms ----- do..	(S)	.2	(NA)	(NA)
335691	Tantalum mill products ----- 1,000 lb..	(D)	(D)	(NA)	(NA)
335791	Insulated copper wire and cable (except magnet wire) ----- mil lb..	(S)	1.3	(NA)	(NA)
335770	Magnet wire ----- do..	(S)	(Z)	(NA)	(NA)

See footnotes at end of table.

Table 3. **Materials Consumed by Kind: 1987 and 1982—Con.**

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
	INDUSTRY 3672, PRINTED CIRCUIT BOARDS— Con.				
	Castings (rough and semifinished):				
332012	Iron (gray and malleable) and steel	1,000 s tons..	-	(NA)	(NA)
336005	Aluminum and aluminum-base alloy	mil lb..	(D)	(NA)	(NA)
336003	Other nonferrous	do..	(D)	(NA)	(NA)
339915	Metal powders	do..	(D)	(NA)	(NA)
333902	Precious metals, all forms (including ingot, sheet, strip, solder, plating, electrodes, etc.), except gold	1,000 troy ounces..			
333905	Gold, all forms (including ingot, sheet, strip, solder, plating, electrodes, etc.)	do..	5.3	(NA)	(NA)
362111	Fractional horsepower electric motors less than 1 hp	number..	46.6	(NA)	(NA)
367004	Resistors, capacitors, transformers, electron tubes, semiconductors, and other electronic-type components .....		.1	(NA)	(NA)
		(X)	154.9	(NA)	(NA)
281995	Silicon, hyperpure	1,000 kilograms..			
333977	Germanium	1,000 lb..	(D)	(NA)	(NA)
265001	Paperboard containers, boxes, and corrugated paperboard		(Z)	(NA)	(NA)
333998	Silicon, unalloyed	1,000 s tons..	7.2	(NA)	(NA)
339913	Ferrites (powder and paste)		(Z)	(NA)	(NA)
		(X)	(D)	(NA)	(NA)
	Glass and glass products:				
322923	Tube blanks, except color television picture		-	(NA)	(NA)
322924	Color television picture tube blanks		-	(NA)	(NA)
320311	Other than tube blanks		(Z)	(NA)	(NA)
	Bearings, including mounted and unmounted:				
356218	Ball .....		.1	(NA)	(NA)
356201	Roller		-	(NA)	(NA)
364300	Current-carrying wiring devices		(D)	(NA)	(NA)
382501	Electrical instrument mechanisms and meter movements, including instruments relays		(D)	(NA)	(NA)
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., excluding sheets, rods, tubes, and shapes	mil lb..			
344401	Sheet metal products, except stampings		(D)	(NA)	(NA)
345001	Bolts, nuts, screws, washers, rivets, and screw machine products		(X)		
			3.2	(NA)	(NA)
346901	Metal stampings		6.0	(NA)	(NA)
308006	Fabricated plastics products (except gaskets, hose, and belting)		2.2	(NA)	(NA)
365150	Loud speakers, microphones, and tuners (all types)		32.5	(NA)	(NA)
366301	Electronic communication equipment		(D)	(NA)	(NA)
357004	Electronic computing equipment and parts		(X)	(NA)	(NA)
			16.1	(NA)	(NA)
382700	Optical instruments and lenses, except sighting, tracking, and fire control		(D)	(NA)	(NA)
333951	Doped chemicals for electronic use		13.2	(NA)	(NA)
970099	All other materials and components, parts, containers, and supplies		608.2	(NA)	(NA)
971000	Materials, parts, containers, and supplies, n.s.k. ²		613.1	(NA)	(NA)
	INDUSTRY 3674, SEMICONDUCTORS AND RELATED DEVICES				
	Materials, parts, containers, and supplies	(X)	4 414.3	(X)	2 966.6
	Mill shapes and forms, except castings:				
331001	Carbon steel	1,000 s tons..	(D)	(S)	4.2
331020	Alloy steel, except stainless	do..	2.8	(S)	4.0
331031	Stainless steel	do..	.2	(S)	.4
	Copper and copper-base alloy:				
335728	Bare wire for electrical conduction only	mil lb..	(D)	(S)	2.4
335102	Rod, bar, and mechanical wire, including extruded and/ or drawn shapes	do..	3.4	(S)	9.9
335143	Plate, sheet, and strip, including military cups and discs	do..	27.4	(S)	5.0
335152	Pipe and tube	do..	(D)		
	Aluminum and aluminum-base alloy:				
335301	Sheet, plate, and foil	mil lb..	4.1	*.6	.8
335405	Extruded shapes, including extruded rod, bar, pipe, tube, etc.	do..	13.4	*3.8	3.4
335008	All other aluminum mill shapes and forms	do..	.4	**1.1	2.3
335616	Nickel and nickel-base alloy mill shapes and forms	do..	8.9	(S)	2.9
335691	Tantalum mill products	1,000 lb..	-	(D)	(D)
335791	Insulated copper wire and cable (except magnet wire)	mil lb..	(D)		
335770	Magnet wire	do..	(D)	(S)	2.0
	Castings (rough and semifinished):				
332012	Iron (gray and malleable) and steel	1,000 s tons..	(S)	-	-
336005	Aluminum and aluminum-base alloy	mil lb..	(Z)	(S)	1.6
336003	Other nonferrous	do..	.1	(D)	(D)
339915	Metal powders	do..	(D)	(D)	(D)
333902	Precious metals, all forms (including ingot, sheet, strip, solder, plating, electrodes, etc.), except gold	1,000 troy ounces..			
333905	Gold, all forms (including ingot, sheet, strip, solder, plating, electrodes, etc.)	do..	22.5	*575.1	132.3
362111	Fractional horsepower electric motors less than 1 hp	number..	142.4	(S)	1.0
367004	Resistors, capacitors, transformers, electron tubes, semiconductors, and other electronic-type components		(Z)		
281995	Silicon, hyperpure	1,000 kilograms..	830.5	(X)	338.4
333977	Germanium	1,000 lb..	160.2	(S)	111.5
265001	Paperboard containers, boxes, and corrugated paperboard		1.2	2.4	.8
333998	Silicon, unalloyed	1,000 s tons..	6.8	(X)	(*)
339913	Ferrites (powder and paste)		12.6	(X)	(*)
		(X)	.8	(D)	(D)

See footnotes at end of table.

Table 3. Materials Consumed by Kind: 1987 and 1982—Con.

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
INDUSTRY 3674, SEMICONDUCTORS AND RELATED DEVICES—Con.					
Glass and glass products:					
322923	Tube blanks, except color television picture	(X)	(D)	(X)	1.8
322924	Color television picture tube blanks	(X)	-	(X)	(D)
320311	Other than tube blanks	(X)	7.1	(X)	6.9
Bearings, including mounted and unmounted:					
356218	Ball	(X)	(D)	(X)	(*)
356201	Roller	(X)	(D)	(X)	(*)
364300	Current-carrying wiring devices	(X)	(D)	(X)	(D)
382501	Electrical instrument mechanisms and meter movements, including instrument relays	(X)	10.6	(X)	5.4
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding sheets, rods, tubes, and shapes	(S)	25.0	(S)	29.9
344401	Sheet metal products, except stampings	(X)	1.5	(X)	12.0
345001	Bolts, nuts, screws, washers, rivets, and screw machine products	(X)	9.9	(X)	8.8
346901	Metal stampings	(X)	42.7	(X)	94.3
308006	Fabricated plastics products (except gaskets, hose, and belting)	(X)	15.6	(X)	11.2
365150	Loud speakers, microphones, and tuners (all types)	(X)	(Z)	(X)	.5
366301	Electronic communication equipment	(X)	(D)	(X)	(D)
357004	Electronic computing equipment and parts	(X)	21.4	(X)	18.1
382700	Optical instruments and lenses, except sighting, tracking, and fire control	(X)	18.7	(X)	(D)
333951	Doped chemicals for electronic use	(X)	43.0	(X)	(*)
970099	All other materials and components, parts, containers, and supplies	(X)	1 053.1	(X)	*1 532.2
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	1 826.7	(X)	583.1
INDUSTRY 3675, ELECTRONIC CAPACITORS					
Materials, parts, containers, and supplies					
		(X)	487.3	(X)	420.7
Mill shapes and forms, except castings:					
331001	Carbon steel	(D)	(D)	(D)	(D)
331020	Alloy steel, except stainless	(S)	(Z)	(D)	(D)
331031	Stainless steel	(S)	(Z)	(D)	(D)
Copper and copper-base alloy:					
335728	Bare wire for electrical conduction only	(S)	1.2	(S)	2.8
335102	Rod, bar, and mechanical wire, including extruded and/ or drawn shapes	(D)	(D)	(S)	.6
335143	Plate, sheet, and strip, including military cups and discs	(D)	(D)	(D)	(D)
335152	Pipe and tube	(S)	(Z)	(D)	(D)
Aluminum and aluminum-base alloy:					
335301	Sheet, plate, and foil	(S)	22.9	(S)	33.8
335405	Extruded shapes, including extruded rod, bar, pipe, tube, etc.	(S)	2.0	(S)	3.0
335008	All other aluminum mill shapes and forms	(S)	.1	(D)	(D)
335616	Nickel and nickel-base alloy mill shapes and forms	(D)	(D)	(D)	(D)
335691	Tantalum mill products	(D)	(D)	(S)	36.1
335791	Insulated copper wire and cable (except magnet wire)	(S)	.2	(D)	(D)
335770	Magnet wire	(D)	(D)	.2	.4
Castings (rough and semifinished):					
332012	Iron (gray and malleable) and steel	-	-	-	-
336005	Aluminum and aluminum-base alloy	(D)	(D)	(D)	(D)
336003	Other nonferrous	(D)	(D)	(D)	(D)
339915	Metal powders	(S)	33.8	(D)	(D)
333902	Precious metals, all forms (including ingot, sheet, strip, solder, plating, electrodes, etc.), except gold	(S)	70.5	(S)	49.1
333905	Gold, all forms (including ingot, sheet, strip, solder, plating, electrodes, etc.)	4.8	2.3	(D)	(D)
362111	Fractional horsepower electric motors less than 1 hp	-	-	(D)	(D)
367004	Resistors, capacitors, transformers, electron tubes, semiconductors, and other electronic-type components	(X)	15.4	(D)	(D)
281995	Silicon, hyperpure	-	-	(D)	(D)
333977	Germanium	-	-	-	-
265001	Paperboard containers, boxes, and corrugated paperboard	(X)	7.6	(X)	(*)
333998	Silicon, unalloyed	-	-	(X)	(*)
339913	Ferrites (powder and paste)	(X)	(D)	(X)	(D)
Glass and glass products:					
322923	Tube blanks, except color television picture	(X)	(D)	(X)	(D)
322924	Color television picture tube blanks	(X)	-	(X)	-
320311	Other than tube blanks	(X)	(D)	(X)	(D)
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding sheets, rods, tubes, and shapes	**8.0	4.9	(S)	6.5
Bearings, including mounted and unmounted:					
356218	Ball	(X)	(D)	(X)	(*)
356201	Roller	(X)	(D)	(X)	(*)
364300	Current-carrying wiring devices	(X)	.4	(X)	(D)
382501	Electrical instrument mechanisms and meter movements, including instrument relays	(X)	.2	(X)	(Z)
344401	Sheet metal products, except stampings	(X)	.3	(X)	(D)
345001	Bolts, nuts, screws, washers, rivets, and screw machine products	(X)	2.7	(X)	5.4
346901	Metal stampings	(X)	1.9	(X)	7.5
308006	Fabricated plastics products (except gaskets, hose, and belting)	(X)	3.9	(X)	2.8
365150	Loud-speakers, microphones, and tuners (all types)	(X)	-	(X)	-
366301	Electronic communication equipment	(X)	-	-	-

See footnotes at end of table.

Table 3. **Materials Consumed by Kind: 1987 and 1982—Con.**

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
	INDUSTRY 3675, ELECTRONIC CAPACITORS— Con.				
357004	Electronic computing equipment and parts	(X)	(D)	(X)	(D)
382700	Optical instruments and lenses, except sighting, tracking, and fire control	(X)	(Z)	(X)	-
333951	Doped chemicals for electronic use	(X)	.9	(X)	(*)
970099	All other materials and components, parts, containers, and supplies	(X)	162.3	(X)	*157.7
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	143.2	(X)	40.1
	INDUSTRY 3676, ELECTRONIC RESISTORS				
	Materials, parts, containers, and supplies	(X)	232.1	(X)	214.1
	Mill shapes and forms, except castings:				
331001	Carbon steel	**2	.2	(S)	.8
331020	Alloy steel, except stainless	(D)	(D)	(S)	(D)
331031	Stainless steel	(D)	(D)	(S)	1.4
	Copper and copper-base alloy:				
335728	Bare wire for electrical conduction only	(S)	5.7	(S)	7.8
335102	Rod, bar, and mechanical wire, including extruded and/ or drawn shapes	(S)	.2	(S)	1.0
335143	Plate, sheet, and strip, including military cups and discs	**3	.6	(D)	(D)
335152	Pipe and tube	-	-	(D)	(D)
	Aluminum and aluminum-base alloy:				
335301	Sheet, plate, and foil	(S)	(Z)	-	-
335405	Extruded shapes, including extruded rod, bar, pipe, tube, etc.	(D)	(D)	(S)	(Z)
335008	All other aluminum mill shapes and forms	(S)	(Z)	-	-
335616	Nickel and nickel-base alloy mill shapes and forms	(S)	.7	(S)	.7
335691	Tantalum mill products	-	-	-	(D)
335791	Insulated copper wire and cable (except magnet wire)	(S)	.7	(S)	1.3
335770	Magnet wire	(D)	(D)	(D)	(D)
	Castings (rough and semifinished):				
332012	Iron (gray and malleable) and steel	(D)	(D)	(D)	(D)
336005	Aluminum and aluminum-base alloy	(S)	(Z)	(D)	(D)
336003	Other nonferrous	(S)	.5	(S)	.1
339915	Metal powders	(S)	1.1	(D)	(D)
333902	Precious metals, all forms (including ingot, sheet, strip, solder, plating, electrodes, etc.), except gold	(S)	11.1	**101.7	13.2
333905	Gold, all forms (including ingot, sheet, strip, solder, plating, electrodes, etc.)	(S)	2.4	-	-
362111	Fractional horsepower electric motors less than 1 hp	(S)	(Z)	(D)	(D)
367004	Resistors, capacitors, transformers, electron tubes, semiconductors, and other electronic-type components	(X)	21.8	(D)	(D)
281995	Silicon, hyperpure	-	-	-	-
333977	Germanium	-	-	-	-
265001	Paperboard containers, boxes, and corrugated paperboard	(X)	2.2	(X)	(*)
333998	Silicon, unalloyed	-	-	(X)	(*)
339913	Ferites (powder and paste)	(X)	(D)	(X)	(D)
	Glass and glass products:				
322923	Tube blanks, except color television picture	(X)	.2	(X)	(D)
322924	Color television picture tube blanks	(X)	-	(X)	-
320311	Other than tube blanks	(X)	-	(X)	(D)
	Bearings, including mounted and unmounted:				
356218	Ball	(X)	(D)	(X)	(*)
356201	Roller	(X)	(Z)	(X)	(*)
364300	Current-carrying wiring devices	(X)	(D)	(X)	.4
382501	Electrical instrument mechanisms and meter movements, including instrument relays	(X)	(Z)	(X)	.1
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding sheets, rods, tubes, and shapes	(S)	5.0	(S)	4.2
344401	Sheet metal products, except stampings	(X)	.1	(X)	(D)
345001	Bolts, nuts, screws, washers, rivets, and screw machine products	(X)	3.0	(X)	2.7
346901	Metal stampings	(X)	10.0	(X)	8.7
308006	Fabricated plastics products (except gaskets, hose, and belting)	(X)	8.1	(X)	3.9
365150	Loud speakers, microphones, and tuners (all types)	(X)	-	(X)	-
366301	Electronic communication equipment	(X)	-	(X)	-
357004	Electronic computing equipment and parts	(X)	(D)	(X)	(D)
382700	Optical instruments and lenses, except sighting, tracking, and fire control	(X)	-	(X)	-
333951	Doped chemicals for electronic use	(X)	(D)	(X)	(*)
970099	All other materials and components, parts, containers, and supplies	(X)	52.2	(X)	*114.4
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	100.6	(X)	25.1
	INDUSTRY 3677, ELECTRONIC COILS AND TRANSFORMERS				
	Materials, parts, containers, and supplies	(X)	448.4	(X)	307.0
	Mill shapes and forms, except castings:				
331001	Carbon steel	(S)	7.5	*12.6	22.7
331020	Alloy steel, except stainless	(S)	8.6	(S)	8.6
331031	Stainless steel	(S)	.1	(S)	.1
	Copper and copper-base alloy:				
335728	Bare wire for electrical conduction only	*5.5	11.1	**4.8	9.9
335102	Rod, bar, and mechanical wire, including extruded and/ or drawn shapes	(S)	.9	2.8	3.1
335143	Plate, sheet, and strip, including military cups and discs	*1.2	2.3	(S)	.4
335152	Pipe and tube .....	.2	.4	(S)	.4

See footnotes at end of table.

Table 3. Materials Consumed by Kind: 1987 and 1982—Con.

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
INDUSTRY 3677, ELECTRONIC COILS AND TRANSFORMERS—Con.					
Mill shapes and forms, except castings—Con.					
Aluminum and aluminum-base alloy:					
335301	Sheet, plate, and foil	(S)	.9	*.7	.9
335405	Extruded shapes, including extruded rod, bar, pipe, tube, etc.	(S)	.2	(S)	.9
335008	All other aluminum mill shapes and forms	(S)	1.3	(S)	.6
335616	Nickel and nickel-base alloy mill shapes and forms	(S)	.9	(Z)	(D)
335691	Tantalum mill products	(D)	(D)	(D)	(D)
335791	Insulated copper wire and cable (except magnet wire)	(S)	10.9	(S)	8.5
335770	Magnet wire	(S)	45.6	(S)	24.0
Castings (rough and semifinished):					
332012	Iron (gray and malleable) and steel	(S)	1.1	(D)	(D)
336005	Aluminum and aluminum-base alloy	*.1	.3	(D)	(D)
336003	Other nonferrous	(S)	(Z)	(D)	(D)
339915	Metal powders	(S)	1.1	**3	.7
333902	Precious metals, all forms (including ingot, sheet, strip, solder, plating, electrodes, etc.), except gold	(S)	1.6	(S)	1.0
333905	Gold, all forms (including ingot, sheet, strip, solder, plating, electrodes, etc.)	(D)	(D)	(D)	(D)
362111	Fractional horsepower electric motors less than 1 hp	(D)	(D)	(D)	(D)
367004	Resistors, capacitors, transformers, electron tubes, semiconductors, and other electronic-type components	(X)	30.6	(X)	(D)
281995	Silicon, hyperpure	(S)	(Z)	-	-
333977	Germanium	(X)	2.9	(X)	(*)
265001	Paperboard containers, boxes, and corrugated paperboard	(D)	(D)	(X)	(*)
333998	Silicon, unalloyed	(X)	8.2	(X)	5.0
339913	Ferrites (powder and paste)	(X)	(D)	(X)	-
Glass and glass products:					
322923	Tube blanks, except color television picture	(X)	-	(X)	(D)
322924	Color television picture tube blanks	(X)	-	(X)	-
320311	Other than tube blanks	(X)	(D)	(X)	-
Bearings, including mounted and unmounted:					
356218	Ball	(X)	(D)	(X)	(*)
356201	Roller	(X)	-	(X)	(*)
364300	Current-carrying wiring devices	(X)	1.3	(X)	1.1
382501	Electrical instrument mechanisms and meter movements, including instrument relays	(X)	.4	(X)	.1
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding sheets, rods, tubes, and shapes	(S)	4.2	(S)	4.1
344401	Sheet metal products, except stampings	(X)	5.4	(X)	2.7
345001	Bolts, nuts, screws, washers, rivets, and screw machine products	(X)	4.2	(X)	3.6
346901	Metal stampings	(X)	20.1	(X)	11.9
308006	Fabricated plastics products (except gaskets, hose, and belting)	(X)	7.2	(X)	3.3
365150	Loud speakers, microphones, and tuners (all types)	(X)	(Z)	(X)	-
366301	Electronic communication equipment	(X)	.1	(X)	(D)
357004	Electronic computing equipment and parts	(X)	(D)	(X)	.2
382700	Optical instruments and lenses, except sighting, tracking, and fire control	(X)	(Z)	(X)	(D)
333951	Doped chemicals for electronic use	(X)	1.1	(X)	(*)
970099	All other materials and components, parts, containers, and supplies	(X)	143.3	(X)	*73.9
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	117.4	(X)	86.5
INDUSTRY 3678, ELECTRONIC CONNECTORS					
Materials, parts, containers, and supplies		(X)	1 333.9	(X)	856.1
Mill shapes and forms, except castings:					
331001	Carbon steel	(S)	2.8	(S)	3.0
331020	Alloy steel, except stainless	(S)	.8	(S)	7.1
331031	Stainless steel	(S)	2.3	(S)	5.2
Copper and copper-base alloy:					
335728	Bare wire for electrical conduction only	(S)	1.4	*3.2	7.7
335102	Rod, bar, and mechanical wire, including extruded and/ or drawn shapes	(S)	21.3	**20.9	19.2
335143	Plate, sheet, and strip, including military cups and discs	**28.2	68.7	(S)	48.7
335152	Pipe and tube	(D)	(D)	.5	.7
Aluminum and aluminum-base alloy:					
335301	Sheet, plate, and foil	(S)	1.2	(S)	1.1
335405	Extruded shapes, including extruded rod, bar, pipe, tube, etc.	*5.9	7.8	(S)	5.7
335008	All other aluminum mill shapes and forms	(S)	7.4	*10.0	11.7
335616	Nickel and nickel-base alloy mill shapes and forms	(S)	.5	(S)	(D)
335691	Tantalum mill products	(D)	(D)	-	-
335791	Insulated copper wire and cable (except magnet wire)	(S)	17.8	(S)	4.2
335770	Magnet wire	-	-	-	-
Castings (rough and semifinished):					
332012	Iron (gray and malleable) and steel	(D)	(D)	(S)	*.7
336005	Aluminum and aluminum-base alloy	(S)	5.6	(S)	1.9
336003	Other nonferrous	(D)	(D)	(S)	*1.6

See footnotes at end of table.

Table 3. **Materials Consumed by Kind: 1987 and 1982—Con.**

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
	INDUSTRY 3678, ELECTRONIC CONNECTORS— Con.				
339915	Metal powders.....mil lb..	(D)	(D)	(D)	(D)
333902	Precious metals, all forms (including ingot, sheet, strip, solder, plating, electrodes, etc.), except gold.....1,000 troy ounces..	(S)	19.1	(S)	110.1
333905	Gold, all forms (including ingot, sheet, strip, solder, plating, electrodes, etc.).....do..	(S)	155.6	(D)	(D)
362111	Fractional horsepower electric motors less than 1 hp.....number..	(S)	(Z)	(D)	(D)
367004	Resistors, capacitors, transformers, electron tubes, semiconductors, and other electronic-type components.....	(X)	43.7	(D)	(D)
281995	Silicon, hyperpure.....1,000 kilograms..	-	-	-	-
333977	Germanium.....1,000 lb..	-	-	-	-
265001	Paperboard containers, boxes, and corrugated paperboard.....	(X)	8.0	(X)	(*)
333998	Silicon, unalloyed.....1,000 s tons..	(D)	(D)	(X)	(*)
339913	Ferrites (powder and paste).....	(X)	(D)	(X)	-
	Glass and glass products:				
322923	Tube blanks, except color television picture.....	(X)	-	(X)	-
322924	Color television picture tube blanks.....	(X)	-	(X)	-
320311	Other than tube blanks.....	(X)	.2	(X)	(D)
	Bearings, including mounted and unmounted:				
356218	Ball.....	(X)	(D)	(X)	(*)
356201	Roller.....	(X)	-	(X)	(*)
364300	Current-carrying wiring devices.....	(X)	12.3	(X)	3.7
382501	Electrical instrument mechanisms and meter movements, including instrument relays.....	(X)	(D)	(X)	(D)
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding sheets, rods, tubes, and shapes.....mil lb..	(S)	70.1	(S)	21.5
344401	Sheet metal products, except stampings.....	(X)	(D)	(X)	.1
345001	Bolts, nuts, screws, washers, rivets, and screw machine products.....	(X)	61.3	(X)	26.8
346901	Metal stampings.....	(X)	187.8	(X)	34.4
308006	Fabricated plastics products (except gaskets, hose, and belting).....	(X)	116.2	(X)	18.0
365150	Loud speakers, microphones, and tuners (all types).....	(X)	-	(X)	-
366301	Electronic communication equipment.....	(X)	(D)	(X)	-
357004	Electronic computing equipment and parts.....	(X)	(D)	(X)	(D)
382700	Optical instruments and lenses, except sighting, tracking, and fire control.....	(X)	(D)	(X)	-
333951	Doped chemicals for electronic use.....	(X)	1.2	(X)	(*)
970099	All other materials and components, parts, containers, and supplies.....	(X)	219.2	(X)	*180.1
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	227.3	(X)	303.8
	INDUSTRY 3679, ELECTRONIC COMPONENTS, N.E.C.				
	Materials, parts, containers, and supplies.....	(X)	*6 549.4	(NA)	(*)
	Mill shapes and forms, except castings:				
331001	Carbon steel.....1,000 s tons..	(S)	4.9	(NA)	(NA)
331020	Alloy steel, except stainless.....do..	(S)	18.9	(NA)	(NA)
331031	Stainless steel.....do..	(S)	3.0	(NA)	(NA)
	Copper and copper-base alloy:				
335728	Bare wire for electrical conduction only.....mil lb..	**2.9	4.7	(NA)	(NA)
335102	Rod, bar, and mechanical wire, including extruded and/ or drawn shapes.....do..	(S)	5.1	(NA)	(NA)
335143	Plate, sheet, and strip, including military cups and discs.....do..	(S)	11.4	(NA)	(NA)
335152	Pipe and tube.....do..	(S)	1.8	(NA)	(NA)
	Aluminum and aluminum-base alloy:				
335301	Sheet, plate, and foil.....mil lb..	(S)	12.3	(NA)	(NA)
335405	Extruded shapes, including extruded rod, bar, pipe, tube, etc.....do..	(S)	14.5	(NA)	(NA)
335008	All other aluminum mill shapes and forms.....do..	(S)	11.6	(NA)	(NA)
335616	Nickel and nickel-base alloy mill shapes and forms.....do..	(S)	6.9	(NA)	(NA)
335691	Tantalum mill products.....1,000 lb..	(S)	.2	(NA)	(NA)
335791	Insulated copper wire and cable (except magnet wire).....mil lb..	(S)	71.8	(NA)	(NA)
335770	Magnet wire.....do..	(S)	6.1	(NA)	(NA)
	Castings (rough and semifinished):				
332012	Iron (gray and malleable) and steel.....1,000 s tons..	(S)	2.6	(NA)	(NA)
336005	Aluminum and aluminum-base alloy.....mil lb..	(S)	15.8	(NA)	(NA)
336003	Other nonferrous.....do..	(S)	4.7	(NA)	(NA)
339915	Metal powders.....do..	(S)	11.7	(NA)	(NA)
333902	Precious metals, all forms (including ingot, sheet, strip, solder, plating, electrodes, etc.), except gold.....1,000 troy ounces..	(S)	11.3	(NA)	(NA)
333905	Gold, all forms (including ingot, sheet, strip, solder, plating, electrodes, etc.).....do..	(S)	21.5	(NA)	(NA)
362111	Fractional horsepower electric motors less than 1 hp.....number..	(S)	5.3	(NA)	(NA)
367004	Resistors, capacitors, transformers, electron tubes, semiconductors, and other electronic-type components.....	(X)	1 439.4	(NA)	(NA)
281995	Silicon, hyperpure.....1,000 kilograms..	(S)	1.5	(NA)	(NA)
333977	Germanium.....1,000 lb..	(D)	(*)	(NA)	(NA)
265001	Paperboard containers, boxes, and corrugated paperboard.....	(X)	19.4	(NA)	(NA)
333998	Silicon, unalloyed.....1,000 s tons..	(D)	(*)	(NA)	(NA)
339913	Ferrites (powder and paste).....	(X)	40.1	(NA)	(NA)
	Glass and glass products:				
322923	Tube blanks, except color television picture.....	(X)	.5	(NA)	(NA)
322924	Color television picture tube blanks.....	(X)	.2	(NA)	(NA)
320311	Other than tube blanks.....	(X)	6.4	(NA)	(NA)

See footnotes at end of table.

Table 3. Materials Consumed by Kind: 1987 and 1982—Con.

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
	INDUSTRY 3679, ELECTRONIC COMPONENTS, N.E.C.—Con.				
	Bearings, including mounted and unmounted:				
356218	Ball	(X)	1.7	(NA)	(NA)
356201	Roller	(X)	1.6	(NA)	(NA)
364300	Current-carrying wiring devices	(X)	38.6	(NA)	(NA)
382501	Electrical instrument mechanisms and meter movements, including instrument relays	(X)	65.1	(NA)	(NA)
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding sheets, rods, tubes, and shapes	(S)	18.4	(NA)	(NA)
344401	Sheet metal products, except stampings	(X)	41.5	(NA)	(NA)
345001	Bolts, nuts, screws, washers, rivets, and screw machine products	(X)	87.8	(NA)	(NA)
346901	Metal stampings	(X)	59.3	(NA)	(NA)
308006	Fabricated plastics products (except gaskets, hose, and belting)	(X)	111.4	(NA)	(NA)
365150	Loud speakers, microphones, and tuners (all types)	(X)	3.3	(NA)	(NA)
366301	Electronic communication equipment	(X)	72.7	(NA)	(NA)
357004	Electronic computing equipment and parts	(X)	73.0	(NA)	(NA)
382700	Optical instruments and lenses, except sighting, tracking, and fire control	(X)	(*)	(NA)	(NA)
333951	Doped chemicals for electronic use	(X)	4.3	(NA)	(NA)
970099	All other materials and components, parts, containers, and supplies	(X)	\$2 336.3	(NA)	(NA)
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	1 880.8	(NA)	(NA)

¹For some establishments, data have been estimated from central unit values which are based on quantity-cost relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

²Total cost of materials of establishments that did not report detailed materials data, including establishments that were not mailed a form.

³Industry content is new for 1987; therefore, 1982 material consumed data are not available.

⁴For 1982, data for these material codes were not collected separately but were included with material code 970099.

⁵For 1982, material code 332012 was included with material code 336003 to avoid disclosing data for individual companies.

⁶For 1987, material codes 333977, 333998, and 382700 are included with material code 970099 to avoid disclosing data for individual companies.

APPENDIX

Scope and Coverage and Explanation of Terms

GENERAL

The 1987 Census of Manufactures is the 32nd census of manufacturing establishments conducted in the United States. For 1987, it was conducted as part of the economic censuses, which included the censuses of mineral industries, construction industries, retail and wholesale trades, service industries, selected transportation activities, and minority-owned and women-owned businesses, under authority of title 13 of the United States Code. Title 13 specifies that an economic census be conducted every 5 years to cover years ending in 2 and 7.

SCOPE AND COVERAGE

Establishment Basis of Reporting

The census of manufactures is conducted on an establishment basis. All manufacturing establishments with one paid employee or more at any time during the year are covered by the census of manufactures. Therefore, a company operating at more than one location is required to file a separate report for each location. This report excludes information for separately operated administrative offices, warehouses, garages, and other auxiliary units which service manufacturing establishments of the same company. Where these auxiliary operations are conducted at the same location as the manufacturing operation, they are usually included in the report for the operating manufacturing establishment.

Use of Administrative Records

From a universe of approximately 350,000 manufacturing establishments in the 1987 Census of Manufactures, approximately 150,000 small single-establishment companies were excused from filing reports. Selection of the small establishment nonmail cases was done on an industry-by-industry basis. A variable cutoff was used to determine those establishments for which administrative records were to be used in place of a census report. The cutoffs were selected so the administrative-record cases would account for approximately 3 percent or less of the value of shipments for the industry. These cutoffs were then adjusted so that all single-establishment companies with less than 5 employees were excluded from the mail canvass, while all establishments with more than 20 employees were included. Where establishments in the 5 to 20 employee size range were included in the mail canvass, an abbreviated census form was frequently used.

For these nonmail establishments, (and a small number of larger establishment whose reports were not received at the time the data were tabulated) data on employment, payroll, and receipts were obtained from administrative records of other government agencies rather than from census forms. The administrative-record information was then used in conjunction with industry averages to estimate the data for these establishments. The value of shipments and cost of materials were not distributed among specific products and materials but were included in the product and material "not specified by kind" (n.s.k.) categories.

EXPLANATION OF TERMS

Number of establishments and companies—A separate report was required for each manufacturing establishment (plant) with one employee or more. An establishment is defined as a single physical location where manufacturing is performed. A company, on the other hand, is defined as a business organization consisting of one establishment or more under common ownership or control.

All employees—Includes all full-time and part-time employees on the payrolls at any time during the year. Included are all persons on paid sick leave, paid holidays, and paid vacations. Officers of corporations are included as employees; proprietors and partners of unincorporated firms are excluded. The "all employees" number is the average number of production workers plus the number of other employees in mid-March. The number of production workers is the average of those for midmonth payroll periods of March, May, August, and November.

Production workers—Includes workers up through the working-supervisor level engaged in fabricating, processing, assembling, inspecting, receiving, packing, warehousing, shipping (but not delivering), maintenance, repair, janitorial, guard services, product development, auxiliary production for plant's own use (e.g., power-plant), recordkeeping, and other closely associated services. Truckdrivers delivering ready-mixed concrete are also included in production workers.

Other employees—Includes nonproduction personnel, including those engaged in the following activities: supervision above working-supervisor level, sales (including driver/salespersons), sales delivery (truckdrivers and helpers), advertising, credit collection, installation and

servicing of own product, clerical and routine office functions, executive, purchasing, finance, legal, personnel (including cafeteria, etc.), professional, and technical employees.

Payroll—Includes the gross earnings for the “employees” defined above, such as salaries, wages, commissions, dismissal pay, bonuses, vacation and sick leave pay, and compensation in kind, prior to such deductions as employees’ Social Security contributions, withholding taxes, group insurance, union dues, and savings bonds. Respondents were told that in reporting they could follow the definition of payrolls used for calculating the Federal withholding tax.

Production-worker hours—Covers hours worked or paid for at the plant, including actual overtime hours (not straight-time equivalent hours). It excludes hours paid for vacations, holidays, or sick leave when the employee was not at the plant.

Cost of materials—Refers to direct charges actually paid or payable for items consumed or put into production during the year, including freight charges and other direct charges incurred by the establishment in acquiring these materials. It includes the cost of materials or fuels consumed, regardless of whether they were purchased by the individual establishment from other companies, transferred to it from other establishments of the same company, or withdrawn from inventory during the year.

The important components of this cost item are (a) all raw materials, semifinished goods, parts, containers, scrap, and supplies put into production or used as operating supplies and for repair and maintenance during the year; (b) electric energy purchased; (c) fuels consumed for heat, power, or generating electricity; (d) work done by others on materials or parts furnished by manufacturing establishments (contract work); and (e) products bought and resold in the same condition.

Specific materials consumed (table 3)—In addition to the total cost of materials which every establishment was required to report, information was also collected for most manufacturing industries on the consumption of major materials used in manufacturing. These inquiries were restricted to those materials which were important parts of the cost of production in a particular industry and for which cost information was available from manufacturers’ records. Establishments consuming less than a specified amount (usually \$10,000) of a specific material were not requested to report consumption of that material separately. Also, the cost of materials for the small establishments for which administrative records were used was estimated as “not specified by kind” (n.s.k.).

Value of shipments and other receipts—Generally refers to received or receivable net selling values, f.o.b. plant (exclusive of freight and taxes), of all products shipped, both primary and secondary, as well as all

miscellaneous receipts such as receipts for contract work performed for others, installation and repair receipts, sale of scrap, and sale of products bought and resold without further processing. Included are all items made by or for the establishment from materials owned by it whether sold, transferred to other plants of the same company, or shipped on consignment. The net selling value of products made in one plant on a contract basis from materials owned by another was reported by the plant providing the materials.

In a few industries, the value of production or value of work completed is used instead of value of shipments. These industries are identified in the introduction and are footnoted in table 1.

In the case of multiunit companies, the manufacturer was requested to report the value of products transferred to other establishments of the same company at full economic or commercial value, that is, including not only the direct costs of production but also a reasonable proportion of “all other costs” (including company overhead and profit).

Shipments or production of individual products (table 2)—In the 1987 census, detailed shipment information was collected for approximately 11,000 individual products. These products are identified by a seven-digit code and are grouped into approximately 1,500 classes of products, which in turn are primary to 459 four-digit industries. Data at the five-digit product-class level have been collected each year as part of the annual survey of manufactures. Information at the seven-digit level, collected for many industries in the current industrial reports program, is not included in this table.

Value added by manufacture—This measure of manufacturing activity is derived by subtracting the cost of materials, supplies, containers, fuel, purchased electricity, and contract work from the value of shipments for products manufactured plus receipts for services rendered. The result of this calculation is then adjusted by the addition of value added by merchandising operations (that is, the difference between the sales value and cost of merchandise sold without further manufacturing, processing, or assembly) plus the net change in finished goods and work-in-process inventories between the beginning and end of the year.

For those industries where value of production is collected instead of value of shipments (see footnote in table 1), value added is adjusted only for the change in work-in-process inventories between the beginning and end of the year. For those industries where value of work done is collected, the value added does not include an adjustment for the change in finished goods or work-in-process inventories.

Value added avoids the duplication in the figure for value of shipments which results from the use of products of some establishments as materials by others. Value

added is considered to be the best value measure available for comparing the relative economic importance of manufacturing among industries and geographic areas.

Expenditures for new plant and equipment—Establishments in operation and any known plants under construction were asked to report their expenditures for (a) permanent additions and major alterations to manufacturing establishments and (b) new machinery and equipment used for replacement and additions to plant capacity if they are of the type for which depreciation accounts are ordinarily maintained.

These totals exclude expenditures for used plant and equipment, expenditures for land, and cost of maintenance and repairs charged as current operating expenses. Data for used plant and equipment will be published in the final industry bulletin.

End-of-year inventories—Comprised of (a) finished products; (b) work-in-process; and (c) materials, supplies, fuels, etc. Beginning in 1982, respondents were asked to report their inventories at (the lower of) cost or market prior to adjustment to LIFO cost. This is a change from prior years in which respondents were permitted to value their inventories using any generally accepted accounting method.

Therefore, 1982 through 1987 data for inventories are not strictly comparable to prior-year data.

Specialization and coverage ratios—An establishment is classified in a particular industry if its shipments of primary products of the industry exceed in value its shipments of the products of any other single industry. An establishments' shipments include those products assigned to an industry (primary products), those considered primary to other industries (secondary products), and receipts for miscellaneous activities (merchandising, contract work, resales, etc.). The following ratios have been developed to measure the relationship of primary product shipments to the data on shipments for the industry shown in table 1 and data on product shipments shown in table 2.

Specialization ratio—Represents the ratio of primary product shipments to total product shipments (primary and secondary, excluding miscellaneous receipts) for the establishments classified in the industry.

Coverage ratio—Represents the ratio of primary products shipped by the establishments classified in the industry to the total shipments of such products that are shipped by all manufacturing establishments, wherever classified.

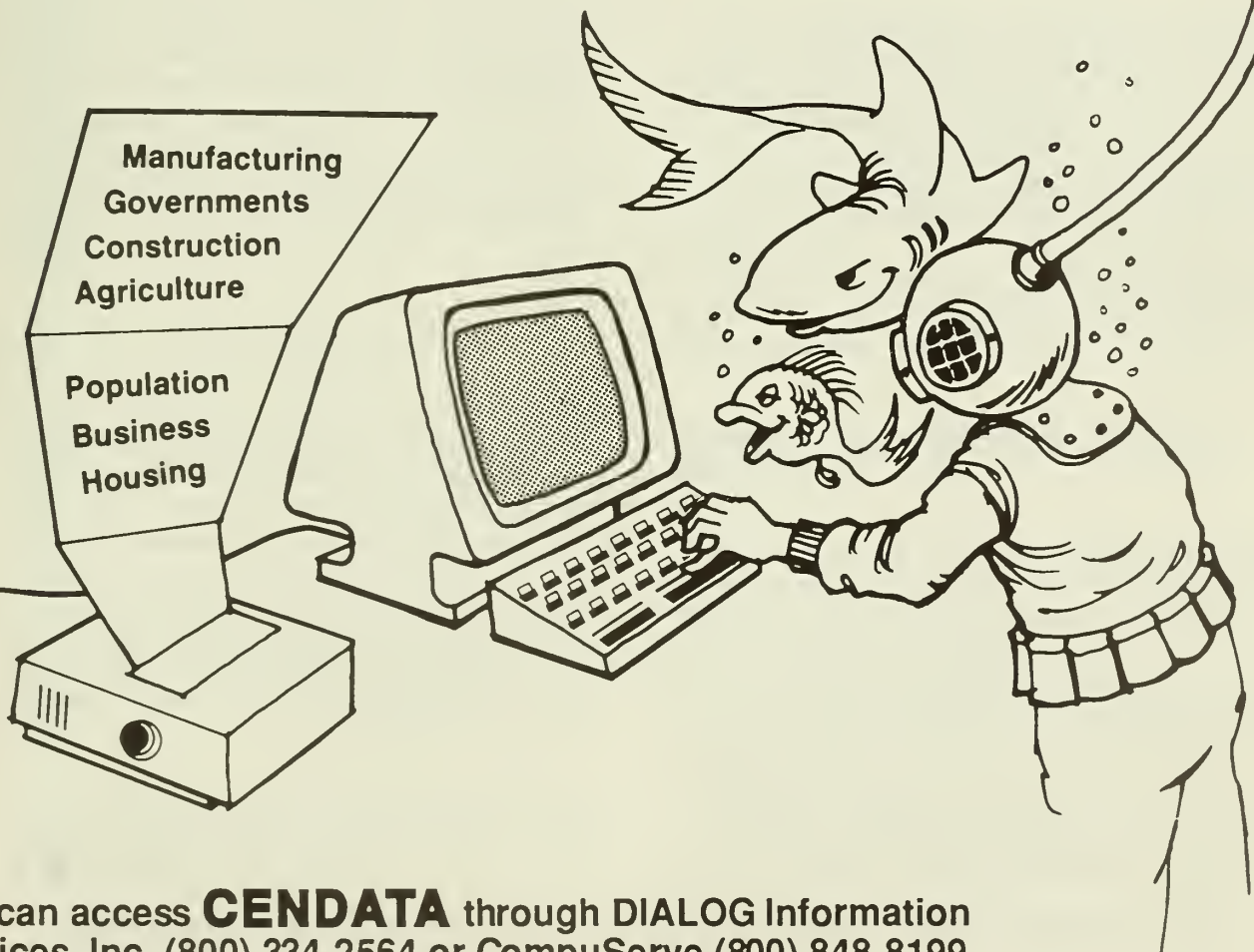


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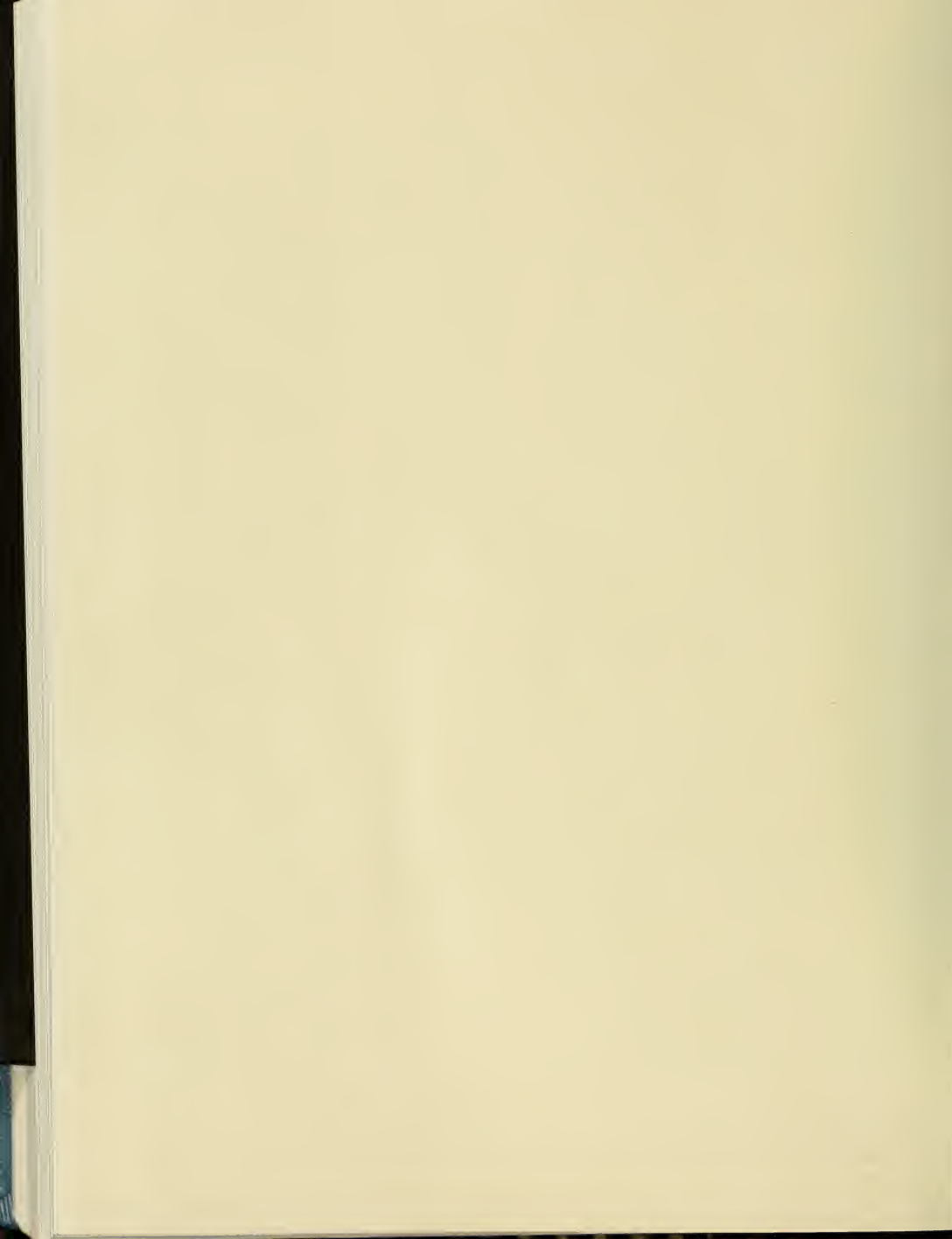
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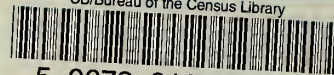


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